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ENTOMOLOGICAL NEWS

JUNE, 1939

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CONTENTS

Voris—Immature Staphylinids of the Genus Quedius. (Coleoptera: Staphylinidae) 151

Hallock—Notes on Pennsylvania Flea Beetles in Tobacco Fields. (Coleoptera: Chrysomelidae). 156

Felt—A New Juniper Midge. (Diptera: Cecidomyiidae). 159

Roberts—New Name for a Genus of the Group Melanopli (Acrididae: Orthoptera). 160

Wing—An Annotated List of the Ants of Maine (Hymenoptera: Formicidae) 161

Knowlton and Allen—Aphids of the Genus Kakimia Infesting Ribes. (Homoptera) 166

Current Entomological Literature. 171

Review of Duncan's A Contribution to the Biology of North American Vespine Wasps. 178

Doings of Societies. The Puget Sound Entomological Society 179

Wesson, Jr.—Leptothorax manni Wesson synonymous with L. pergandei Emery (Hymenoptera: Formicidae). 180

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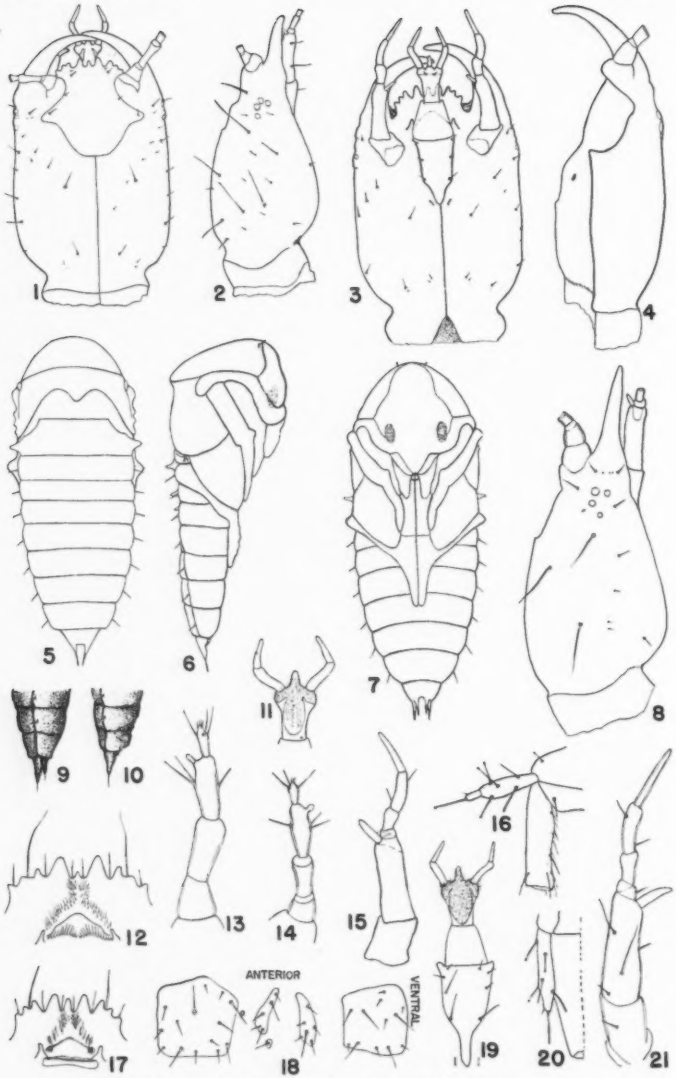

IMMATURE STAPHYLINIDS, GENUS QUEDIUS.—VORIS.

ENTOMOLOGICAL NEWS

VOL. L. JUNE, 1939 No. 6

Immature Staphylinids of the Genus Quedius (Coleoptera: Staphylinidae*).

By RALPH VORIS, Southwest Missouri State Teachers College Springfield, Missouri.

(Plate I.)

The larvae of the genus *Quedius* are small to medium sized, campodeaform; urogomphus short, confluently not more than twice as long as pseudopode, of one or two segments, second segment when present short and fleshy; maxillary palps three; labial palps two; ocelli four or absent.

Key to the known larvae.

1. Urogomphus of one segment; clypeo-labral margin with median tooth very short, clypeal teeth forming an angle of 30° ..... *Q. molochinus.*
   Urogomphus biarticulate ..... 2.
2. Clypeo-labral margin with median tooth nearly as long as lateral, clypeal teeth forming an angle of 40° to 45°. *Q. capucinus.*
   Clypeo-labral margin with median tooth one-half length of first laterals, clypeal teeth forming an angle of 30°. *Q. spelaeus.*

QUEDIUS Stephens.

Quedius Stephens, 1832, Ill. British Ent. 5:214. acc Bernhauer & Schubert, 1916, Junk, Coleop. Cat. pars 67:417.

Egg. Known only in *Quedius molochinus* (Gravenhorst).

Larva. Cylindrical, head and thorax dark testaceous to brownish-rufous, abdomen dirty-gray to dirty-brown.

Head rectangular, sides parallel; not exhibiting a microscopic coriaceous appearance; frontal suture a smooth arc to very slightly flattened at point of union with epicranial suture, gula subtriangular to nipple shaped, reaching one-half distance to neck. *Clypeo-labral* margin with nine prominent teeth, median tooth short, first lateral long, conical, median clypeal

* Entomological Contribution No. 6, Department of Science, Southwest Missouri State Teachers College, Springfield, Missouri.

very distinct. *Ocelli* four except in *Quedius spelaeus* where they are absent. *Antennae* short, stubby, third segment widest near middle and from this point sloping anteriorly and posteriorly. *Maxillae* with palps of three segments, second segment longer than first, slightly curved, bearing one spine on inner surface and one on outer surface; third long, slender, conical. *Labium* with most of the slightly chitinized portion of the dorsal surface of the stipulae, the palpigers and the posterior portion of the ligula covered with small spines; palpigers prominent, not globular; ligula conical; palps of two segments, first long cylindrical, second long, slender conical. Spines below mouth opening may or may not be present, if present in the form of a single row or parts of a row. Spines above the mouth opening arranged in two rather large confused groups extending from a median position towards the corners of the mouth opening. Mouth opening angular.

Abdomen with urogomphus of one or two segments, clothed with a few bristle-like spines; terminal spine long bristle-like and a very short spine on inner angle of apex.

Pupa. Anterior margin of prothorax may or may not bear spines; lateral margins of the fourth, fifth, sixth, seventh, eighth and ninth abdominal segments each bearing spines; terminal segment bearing two spines in the male and four in the female pupa. (see figs. 9 & 10).

QUEDIUS MOLOCHINUS (Gravenhorst).

Staphylinus molochinus Gravenhorst, 1806, Monogr. Coleopterorum Micropterorum 46.

Quedius molochinus Erichson, 1840, Genera et Species Staphylinorum 535. Horn, 1878, Trans. Amer. Ent. Soc. 7:163. Xambeu, 1910, L'Echange 26:47.

(See figs. 4, 8, 12, 13, 19, 20 & 21).

Egg. Oval, yellowish white; surface faintly granular; length 1.2-1.5 mm., width 0.9-1.1 mm.; emergence opening a lengthwise slit.

Larva. Head and thorax dark brownish-rufous, abdomen dirty-gray never becoming yellow. Length mature larva 11.-13. mm., width 1.5-1.7 mm.

Head rectangular, one-half longer than wide, hind angles obtusely rounded; arc of frontal suture not deep but slightly flattened at point of union with epicranial suture; gula slightly nipple shaped; scar located opposite base of nipple. *Clypeolabral* margin with median tooth short, one-fourth length of first lateral; clypeal and labral teeth not forming a smooth arc as the first clypeal tooth is below the line formed by the third

clypeal and first laterals; clypeals forming an angle of 30°. *Ocelli;* second ocellus superior to line between first and third and slightly nearer third than first; second and fourth equidistant from third; fourth ventral and posterior to third; second, third and fourth subequal in diameter and slightly larger than first. *Antennae* with second segment two-fifths longer than first; third widest near middle, as long as second; thumb slender, two and one-half times as long as wide; fourth segment only slightly longer than first; two-thirds as wide as base of third. *Maxillae* with stripes as long as cardo; lacinia nearly as long as palpifer and first segment of palps, four times as long as wide; palps with second segment two-fifths longer than first, spine on inner surface four-fifths anterior, third segment slightly longer than second. *Labium* with band separating posterior half of dorsal surface of palpigers from stipulae narrow; spines on dorsal surface covering posterior two-thirds of the ligula as well as the slightly chitinized portion of the stripes and the dorsal surface of the palpigers; ligula less than one-half as long as first segment of palps; palps with second segment slender, nearly as long as first segment. Spines below mouth opening present, median portion of row depressed so as to appear as two short arcs, median and terminal spines in row shorter. Spines above the mouth opening in two groups extending from a median position to the corners of the mouth opening, spines sparse, confused, and irregular, not arranged as if combed. Mouth opening angular.

Abdomen with urogomphus of one segment; fleshy, not as long as pseudopode, constricted four-fifths posterior but constriction not enough to allow the posterior portion to be called a second segment.

Pupa. Length 7. mm., width 2.6 mm.; spines on anterior margin of prothorax lacking; spines on lateral margins of the fourth, fifth, sixth, seventh, eighth and ninth abdominal segments short, sharp; terminal spines short, sharp; female accessory sharp, slightly longer than terminal spines.

Adult determined by Howard Notman.

The mature and immature individuals both occur under old hay and vegetable debris. They occur with *Q. capucinus* but they are never as abundant. Pupation occurs both above and below the surface of the ground and the place of pupation is relatively deeper than *capucinus.*

One egg was collected at Bloomington, Indiana, 11.14.26 from under old hay. The egg hatched eight days later and in

a few days the larva fed readily on *Drosophila* larvae. Death occurred before the first molt, probably because of the daily variation in the temperature of the laboratory which is abnormally high at night when the building is closed.

In only four cases is the exact age of the pupa known. In these cases the length of the pupal period varied from eleven to fourteen days. All were collected in early spring at Bloomington, Indiana, and were reared inside where they may have been affected by the temperature of the building. No conclusion can be drawn from these figures as to the variation in length of the pupal period of this species.

The material available for study includes four larval exuviae, twenty-two pupal exuviae, and twenty-one reared adults. The immature forms were collected at Bloomington and Charlestown, Indiana and Springfield, Missouri.

QUEDIUS CAPUCINUS (Gravenhorst).

Staphylinus capucinus Gravenhorst, 1806, Monographia Coleopterorum Micropterorum 40.

Distichalius capucinus Casey, 1915, Memoirs on the Coleoptera 6:405.

Quedius capucinus Erichson, 1840, Genera et Species Coleopterorum 531. Horn, 1878, Trans. Amer. Ent. Soc. 7:160. Leng, 1920, Cat. Coleop. Amer. N. of Mexico 109.

(See figs. 1, 2, 3, 5, 6. 7, 9, 10, 11, 14, 15, 16, 17 & 18).

Egg. Unknown.

Larva. Head and thorax brownish-rufous; abdomen dirty-gray, never becoming yellow. Length of mature larva 9. - 11. mm., Width 0.8 - 1.0 mm.

Head rectangular, one-third longer than wide, hind angles prominent, well rounded; neck three-fifths as wide as head; frontal suture forming a deep arc, only slightly flattened at the point of union with the epicranial suture; gular suture subtriangular to very slightly nipple-shaped; posterior tip of scar located lateral to the posterior tip of gula. *Clypeo-labral* margin with median tooth two-thirds as long as first lateral; clypeal and labral teeth forming a rather smooth arc; clypeal teeth forming an angle of 40° - 45°. *Ocelli;* second ocellus very slightly superior to the line between the first and third; fourth almost directly ventral to third; all about equidistant and subequal in size; together they form almost a right angle. *Antennae* with second segment one-half longer than first; third

widest slightly anterior to middle, as wide as and one-half longer than second segment; thumb slightly longer than wide; fourth segment as long as first and as wide as base of third. *Maxillae* with stipes twice as long as cardo; lacinia as long as palpifer and first segment of palps, four times as long as wide; palpifer twice as wide as long; palps with second segment almost twice as long as first, spine on inner surface three-fourths posterior, spine on outer surface three-fourths anterior, third segment long, slender, longer than second. *Labium* with the band separating the posterior half of the dorsal surface of palpigers from the stipulae broad, triangular; ligula one-half as long as first segment of palps, posterior four-fifths of dorsal surface covered with small spines; palps with second segment slightly shorter than first. Spines below the mouth opening absent except at the angles of the mouth. Spines above the mouth opening arranged in two confused groups extending from a median position to the corners of the mouth opening and so arranged in small groups as to appear as if they had been combed transversely with a coarse comb. Mouth opening angular.

Abdomen with urogomphus biarticulate, fleshy; confluently three-fourths as long as pseudopode; second segment short but definitely formed, naked except for terminal spines, twice as long as wide, two-fifths as wide as and one-third as long as first segment.

Pupa. Length 5. - 6. mm., width 2. mm.; anterior margin of prothorax bears one pair of very short stiff spines; lateral margins of the fourth, fifth, sixth, seventh, eighth and ninth abdominal segments each bear a single short sharp spine; terminal spines long, sharp; female accessory spine long, sharp.

Adult determined by Howard Notman.

The larvae, pupae and adults are extremely common under old hay or vegetable debris which is decaying. They are to be found all winter (near Bloomington, Indiana) in such habitats in both the immature and adult stages. The length of the pupal period varies from ten to sixteen days. (For a detailed account see Voris, 1934, Table II.) The larvae form nest-like cavities either above or just below the surface of the ground. As in *P. tetragonocephalus* Notman. the amount of moisture seems to influence the place of pupation.

The material available for study includes 118 slides of larval exuviae and larvae, 143 slides of pupal exuviae and pupae, 138 reared adults and many preserved (alcoholic) specimens of larvae and pupae. All material was collected either at Bloomington, or Charleston, Indiana.

(To be continued.)

Notes on Pennsylvania Flea Beetles in Tobacco Fields (Coleoptera: Chrysomelidae).

By HAROLD C. HALLOCK, Pennsylvania State College.

(Continued from page 124.)

It is interesting to note that Jewett (1929) found that *Epitrix cucumeris* was largely replaced on potatoes in Kentucky by *Epitrix fuscula* as he reported 82 percent of the flea beetles were *Epitrix fuscula*. Although *Epitrix fuscula* was abundant on eggplant in Pennsylvania only a few specimens were found in the potato experimental fields. Lacroix (1935) reported *Epitrix parvula* as a rare insect in Connecticut. It is apparent, that *Epitrix cucumeris* is a northern insect and that *Epitrix parvula* is largely southern in its distribution, yet they are both injurious pests in Lancaster County, Pennsylvania.

Tomatoes. Conspicuous flea beetle feeding was observed upon tomato plants in seed beds and upon plants that had recently been transplanted to the field during May and June 1938. Collections made in late May showed an average of 88 percent *Epitrix cucumeris* and 12 percent *Epitrix parvula*. Very little flea beetle feeding on tomatoes was apparent during the remainder of the 1938 season in the 3 acre tomato field on the Esbenshade farm, although it joined the tobacco field which was heavily infested with *Epitrix parvula* from the middle of August until late October. The September and October figures, which are given in the table, represent collections from a large number of mature tomato plants while the May collections were from about a dozen small plants.

Corn. Five species of flea beetles, which are named in table I, were found moderately plentiful on corn from May until September. The corn was grown adjoining the tobacco fields at the Tobacco Experiment Station and on the Esbenshade farm. Although the flea beetles were observed to feed upon the leaves and the corn silk they never were sufficiently numerous to cause any crop injury. When the corn silk was young 10 to 15 flea beetles were often found burrowing in the silk of each ear. The young corn silk appeared especially attractive to *Epitrix parvula* and their abundance on corn increased at that time.

Ground cherry. Whenever ground cherry (*Physalis* sp.) was found in the vicinity of the three tobacco fields the leaves were always riddled by the flea beetle feeding. The injury to these weeds was caused by the feeding of *Epitrix cucumeris* and *Epitrix parvula.*

Jimson weed. Very little jimson weed (*Datura stramonium* L.) was allowed to grow in the vicinity of the three experimental tobacco fields. When jimson weed plants were found they always had the characteristic flea beetle feeding which was caused in this case by *Epitrix parvula.*

Morning glory. Although wild morning glory (*Convolvulus sepium* L.) generally shows considerable flea beetle foliage injury it can not be classed as a favored host plant of *Epitrix parvula.* During September 1937 wild morning glory, which was growing at the edge of Esbenshade's tobacco field, had a considerable number of *Epitrix parvula* feeding on its leaves. Collections were made again in May and October 1938 and the flea beetle population on wild morning glory was found at that time to be over 95 percent *Chaetocnema confinis.*

Indian mallow. After the old tobacco stumps had been entirely destroyed by plowing in the fall of 1938 a large number of *Epitrix parvula* were found on indian mallow (*Abutilon theophrasti* M.) which remained growing along the edge of the tobacco field at the Tobacco Experiment Station. The flea beetles were found feeding only on the under surface of the indian mallow leaves and they did not eat holes clear through the leaves as in the case of all other host plants observed.

When the tobacco and potato crop remains were destroyed by plowing in early September at the Tobacco Experiment Station the flea beetles congregated upon any small portion of the tobacco plants, which was not completely covered, and upon weeds along the border of the field. These small crop remnants were rapidly destroyed by the flea beetle feeding. The few remaining weeds, which were not destroyed, along the sides of the field were inhabited for a short time but the flea beetle population rapidly decreased in September and October at the

Tobacco Experiment Station. It is interesting to compare this condition with the tobacco field upon the Esbenshade farm that was disced in October instead of the earlier plowing. There was a large amount of tobacco plant remnants left in the field, which had been disced, and a heavy flea beetle population continued in this tobacco field during October.

Summary.

There is considerable variation in the relative abundance of the different species of flea beetles found in the vicinity of tobacco at different periods of the growing season. The most abundant species during April, May and June was *Epitrix cucumeris*. This species caused severe injury to the foliage of tobacco plants that were growing in seed beds and that had been recently transplanted. During the same period heavy feeding by *Epitrix cucumeris* was also observed in potatoes and young tomato plants.

A heavy infestation of *Systena taeniata* var. *blanda* occurred on weeds in June 1937. When the tobacco was transplanted into the field *Systena taeniata* var. *blanda* migrated to the tobacco in large numbers and caused severe injury. This flea beetle was scarce in Lancaster County in 1938.

Although *Epitrix parvula* adults were present on plants in Lancaster County from April until November they did not become sufficiently abundant to cause plant injury until July 1937 and August 1938. This species was the predominating species in tobacco fields during July, August and September. *Epitrix parvula* was scarce on early potatoes but increased in abundance in August. It was often more abundant on potatoes in late August and early September than *Epitrix cucumeris*.

When the tobacco crop had been harvested *Epitrix parvula* continued to feed upon the tobacco suckers which sprouted from the tobacco stumps. The destruction of the tobacco suckers forced *Epitrix parvula* to feed on weeds and other plants along the sides of the tobacco field. When all tobacco crop remains and other favorite food plants of *Epitrix parvula* were destroyed in the early fall this flea beetle soon became scarce

in the vicinity of the tobacco field which had been properly cleaned. When tobacco crop remains were present in the field *Epitrix parvula* continued to feed abundantly until early November in 1938.

It is apparent that *Epitrix parvula* prefers to feed upon tobacco when that plant is present. This flea beetle was also observed to feed readily upon potato, ground cherry, jimson weed, indian mallow, corn, tomato and many other plants to a lesser degree during the fall months.

LITERATURE CITED.

DUCKETT, A. B. 1920. Annotated list of Halticini. Univ. of Md. Agri. Exp. Sta. Bull. 241, p. 111-155.

JEWETT, H. H. 1929. Potato flea-beetles. Ky. Agri. Exp. Sta. Bull. 297, p. 282-301. illus.

LACROIX, D. S. 1935. Insect pests of growing tobacco in Connecticut. Conn. Agri. Exp. Sta. Bull. 379, p. 87-130, illus,

MORGAN, A. C. and GILMORE, J. U. 1924. The tobacco flea-beetle in the dark fire-cured tobacco district of Kentucky and Tennessee. U. S. Dept. Agri. Farmer's Bull. 1425, p. 1-12, illus.

SCHOENE, W. J. and UNDERHILL, G. W. 1937. Suggestions for control of tobacco flea beetle. Va. Agri. Exp. Sta. Bull. 313, p. 11-14, illus.

A New Juniper Midge (Diptera: Cecidomyiidae).

By E. P. FELT, Bartlett Tree Research Laboratories, Stamford, Connecticut.

The insect described below caused serious injury last summer to Juniper twigs in the midwest. Specimens were received in 1938 from Prof. Leonard Haseman, Columbia, Missouri, Prof. George A. Dean, Manhattan, Kansas, Prof. Raymond Roberts, Lincoln, Nebraska, and Lee H. Townsend, Instructor in Zoology, Lexington, Kentucky. Evidently the insect was abundant over a considerable area.

Contarinia juniperina n. sp.

Male. Length 1.5 mm., antennae one-fourth longer than the body, thickly haired, dark brown, 14 segments, the fifth with

stems each with a length two and one-half times the diameter; the terminal segment having the basal stem with a length three times its diameter, the distal enlargement broad with a length about twice its diameter and broadly roundel apically. Palpi; the first segment short, quadrate, the second and third approximately equal and the fourth one-half longer than the third, greatly flattened and broadly rounded. Mesonotum, dark reddish brown, the scutellum reddish brown, the postscutellum fuscus yellowish, abdomen dark reddish brown, wings hyaline, halteres and legs mostly dark straw. The claws simple, the pulvilli as long as the claws. Genitalia; basal clasp segment moderately stout, terminal clasp segment rather short, stout, dorsal plate deeply and triangularly emarginate, the lobes broadly rounded apically; ventral plate deeply and roundly emarginate, the lobes moderately long and irregularly rounded apically; style rather short.

Female. Length 1.5 mm., antennae one-third the length of the body, dark straw, the fifth cylindrical with the enlargement one-half longer than the diameter, the stem one-fourth the length of the enlargement, the terminal segment broad, broadly rounded and with a length one-half greater than the diameter. Mesonotum dark reddish brown, scutellum dark yellowish, postscutellum dark reddish, abdomen reddish brown, ovipositor yellowish, about one-half the length of the body, the terminal lobes with a length six times the width, slender and tapering to an acute point, halteres pale straw, slightly fuscus apically, coxae and femora pale straw, tibiae and tarsi mostly dark straw, otherwise as in the male.

Described from dry specimens reared at Columbia, Missouri, April 1939. This species approaches in general characters the smaller and different *C. balsamifera* Felt. Type deposited in the U. S. National Museum.

New Name for a Genus of the Group Melanopli (Acrididae: Orthoptera).

Necaxacris new name.

This is a new name for the genus *Necaxa* Hebard, Trans. Amer. Ent. Soc., LVIII, p. 290, 1932, which is preoccupied by *Necaxa* Baker 1930 (*Mollusca*). The above name is proposed at this time in order to anticipate any author possibly proposing a name for the genus before my studies on the Mexican Melanopli have been published, since type labels, etc., and manuscript have been already completed for this group.

H. R. Roberts.

An Annotated List of the Ants of Maine (Hymenoptera: Formicidae).

By MERLE W. WING, 35 Bradbury Street, Old Town, Maine.

Concerning the extent of Maine's formicifauna, Dr. W. M. Wheeler[1] states: "I believe that there can be hardly more than 35 or 40 species, subspecies and varieties in the whole State." In this paper 54 forms are listed for Maine. Only those forms which have been specifically determined are included. Approximately 13 species, subspecies, and varieties not fully determined have been omitted. It would seem that ultimately more forms will be added to this list, in that the collecting to date has not been intensive throughout the State. Of the 54 forms listed, the following have been taken for the first time: *Formica vetula* Wheeler and *F. rubicunda* Emery.

The annotations while few and brief have been made only on forms collected by the writer. The works of W. M. Wheeler, C. W. Johnson, and William Procter have been used freely. Local names followed by Wheeler refer to the Casco Bay Region, while those followed by Johnson, Procter, or Brower refer to the Mt. Desert Region. From these works, further annotations on species listed herein can be obtained together with information on the climate and geography of Maine.

The writer acknowledges the valuable assistance rendered by the late Dr. W. M. Wheeler in guidance during the early stages of this investigation; to Dr. M. R. Smith and Dr. Neal A. Weber thanks are due for their determinations, verifications, and valuable assistance of a general nature. In addition various unpublished records have been supplied by Dr. M. R. Smith and Mr. H. B. Peirson, State Entomologist.

Subfamily PONERINAE.

1. PONERA COARCTATA subsp. PENNSYLVANICA Buckley. Casco Bay Region (Wheeler); Bar Harbor, Tremont (A. E. Brower); Oakland (D. S. Fink); Orono (G. W. Simpson). Enfield (A. W. Berrie); Old Town, Orono (Wing).

Many small colonies under stones along edge of clearings near Old Town.

[1] The Ants of Casco Bay, Maine, with Observations on Two Races of *Formica sanguinea* Latreille. Bull. Amer. Mus. Nat. Hist. 24, Art. 33, 1908, p. 619.

Subfamily MYRMICINAE.

2. MYRMICA BREVINODIS Emery. Casco Bay Region (Wheeler); Hodgdon Brook, Station F181 (Procter); Enfield (A. W. Berrie); Presque Isle, Lamoine (Wing).

Forming medium-sized colonies under stones and bits of wood in open places.

3. M. BREVINODIS subsp. SULCINODOIDES Emery. "Maine" (Emery); Ogunquit (Pratt).

4. M. LOBICORNIS subsp. FRACTICORNIS Emery. Lower Goose Island, Sebascodegan Island (Wheeler); S. W. Harbor, Green Mt., Long Pond (Johnson, Procter); Station F 173, Eden-Town Hill Road (Procter); Presque Isle, Old Town (Wing).

5. M. SABULETI subsp. AMERICANA Weber (M. S.) Mt. Desert (Hagen, McAtee); Old Town (Wing).

6. M. SCABRINODIS SCHENCKI var. EMERYANA Forel. "Maine" (Emery); S. W. Harbor, Witch Hole Pond (Johnson, Procter); Robinson Mt. (Procter); Orono (I. H. Blake); Ash Point, Old Town (Wing).

7. STENAMMA BREVICORNE (Mayr). Dikes Peak (A. E. Brower); Ash Point, Presque Isle (Wing).

Forming small colonies under moss-covered bark of rotted stumps in coniferous growth near Presque Isle.

8. S. BREVICORNE DIECKI var. IMPRESSUM Emery. Orono (I. H. Blake).

9. APHAENOGASTER FULVA AQUIA var. PICEA Emery. South Harpswell, Sebascodegan Island (Wheeler); Old Town (Wing).

One colony nesting in rotted stump in moist woods.

10. CREMATOGASTER LINEOLATA (Say). South Harpswell, Ragged Island (Wheeler); Robinson Mt., Cadillac Cliffs, Salisbury Cove (Johnson); Eden (Procter); Old Town (Wing).

11. C. LINEOLATA var. CERASI (Fitch). "Maine" (Emery).

12. LEPTOTHORAX CURVISPINOSUS Mayr. South Harpswell (Wheeler); Paris (Frost).

13. L. CURVISPINOSUS subsp. AMBIGUUS Emery. Mt. Desert (McAtee).

14. L. ACERVORUM subsp. CANADENSIS Prov. Stover's Point, near South Harpswell, Ragged Island (Wheeler); S. W. Harbor (Johnson, Procter); Paris (Frost); Orono (Severin, Wing); Ash Point, Old Town, Presque Isle (Wing).

15. L. EMERSONI Wheeler. Stover's Point, near South Harpswell (Wheeler); Lamoine (Wing).

Subfamily DOLICHODERINAE.

16. DOLICHODERUS TASCHENBERGI Mayr. Robinson Mt. (Procter).

17. D. TASCHENBERGI var. GAGATES Wheeler. South Harpswell, Sebascodegan Island (Wheeler).

18. D. PLAGIATUS Mayr. Section 26 (Procter); Ash Point, Old Town (Wing).

One colony nesting under stone in blueberry field at Ash Point.

19. D. PLAGIATUS var. INORNATUS Wheeler. S. W. Harbor (Johnson); Break Neck Pond (Procter).

20. D. PLAGIATUS subsp. PUSTULATUS Mayr. South Harpswell, Sebascodegan Island (Wheeler).

21. TAPINOMA SESSILE (Say). Prince's Point, Lower Goose Island (Wheeler); S. W. Harbor (Johnson Procter); Station F173 (Procter); Ash Point, Old Town, Orono, Presque Isle (Wing).

Subfamily FORMICINAE.

22. BRACHYMYRMEX HEERI subsp. DEPILIS Emery. South Harpwell, Lower Goose Island, Prince's Point (Wheeler); Orono (I. M. Burgess, Wing); Old Town (Wing).

23. CAMPONOTUS HERCULEANUS (L.). Harpswell Neck, Lower Goose Island, Prince's Point, Sebascodegan Island (Wheeler).

24. C. HERCULEANUS var. WYMPERI Forel. South Harpswell (Wheeler); Bar Harbor, Narrows (Johnson, Procter); Section 15 (Procter); Reeds Island, Penobscot Bay (A. C. Burrill); Heald Pond, near Jackman (F. A. Jones); Orono (J. F. Whitney); Ash Point, Lamoine, Presque Isle (Wing).

25. C. HERCULEANUS subsp. PENNSYLVANICUS (Degeer). Bar Harbor (Johnson); Mt. Desert Region (Procter); Mt. Katahdin (Hamlin, I. H. Blake); Bethel (Mus. Comp. Zoöl, I. H. Blake); Orono, Presque Isle (Wing).

26. C. HERCULEANUS LIGNIPERDA var. NOVAEBORACENSIS (Fitch). Harpswell Neck, Lower Goose Island, Prince's Point, Sebascodegan Island, Ragged Island, Haskell Island (Wheeler); Mt. Desert Region (Johnson, Procter); West Beach (Mus. Comp. Zoöl.); Lincolnville (Heald); Orono (C. O. Dirks, I. H. Blake, Wing); Ash Point, Old Town, Presque Isle (Wing).

27. C. HERCULEANUS LIGNIPERDA var. RUBENS Wheeler. Norway (S. J. Smith); Bethel (A. M. Edwards).

28. C. CARYAE (Fitch). Robinson Mt. (Procter); Orono (Wing).

A single stray worker taken.

29. LASIUS NIGER var. SITKAËNSIS Pergande. Long Pond, Bar Harbor (Johnson, Procter); Corfield (Procter); Penobscot Bay (A. C. Burrill); Presque Isle (Wing).

Nesting at base of rotted stump in moist woods.

30. L. NIGER var. NEONIGER Emery. South Harpswell, Ram Island, Haskell Island, Ragged Island, Lower Goose Island, Sebascodegan Island (Wheeler); Matinicus Island (U. S. Biol. Surv.); Norway (S. J. Smith); Bethel (Mus. Comp. Zoöl.); Ash Point, Lamoine, Old Town, Orono, Presque Isle (Wing).

31. L. NIGER var. AMERICANUS Emery. Casco Bay Region (Wheeler); Mt. Desert (McAtee); Stations F150 and F173 (Procter); Bridgeport (Miss Edmonds); Oakland (D. S. Fink); Enfield (A. W. Berrie); Ash Point, Old Town Presque Isle (Wing).

32. L. BREVICORNIS Emery. Northern portions of Casco Bay, Haskell Island (Wheeler).

33. L. UMBRATUS MIXTUS var. APHIDICOLA (Walsh). "Maine" (Emery); S. W. Harbor, Green Mt. (Johnson, Procter); Pretty Marsh, Bubble Pond (Procter); Elms (Deane); Orono (I. H. Blake).

34. L. UMBRATUS subsp. MINUTUS Emery. "Maine" (Emery).

35. L. UMBRATUS subsp. SUBUMBRATUS Viereck. Bar Harbor (Johnson); Mt. Desert (Procter); Penobscot Bay (A. C. Burrill); Ash Point (Wing).

Three winged queens were captured on August 5, 1938 as they were dropping down from their nuptial flight in the late afternoon.

36. L. (ACANTHOMYOPS) INTERJECTUS Mayr. Corfield (Procter).

37. L. (A.) CLAVIGER Roger. Deer Brook, Station F218 (Procter).

38. L. (A.) CLAVIGER var. SUBGLABER Emery. Sebascodegan Island (Wheeler).

39. FORMICA NEOGAGATES Emery. South Harpswell. Prince's Point, Lower Goose Island, Sebascodegan Island (Wheeler); S. W. Harbor, Bar Harbor (Johnson, Procter); Oakland (D. S. Fink); Ash Point, Old Town, Orono (Wing).

40. F. NEOGAGATES LASIOIDES var. VETULA Wheeler. Aroostook No. 1, Ash Point, Old Town, Presque Isle (Wing).

This form makes rather small colonies under stones in open dry fields.

41. F. PALLIDE-FULVA subsp. SCHAUFUSSI Mayr. Ogunquit (Pratt).

42. F. FUSCA L. South Harpswell, Lower Goose Island (Wheeler); Mt. Desert Region (Johnson, Procter); Monmouth (Frost); Presque Isle (Wing).

43. F. FUSCA var. SUBSERICEA Say. South Harpswell, Sebascodegan Island, Lower Goose Island, Prince's Point (Wheeler); New Mill Pond, Jordan Pond, Seal Cove, (Procter).

44. F. FUSCA var. ARGENTEA Wheeler. South Harpswell, Sebascodegan Island, Lower Goose Island (Wheeler).

45. F. FUSCA var. SUBAENESCENS Emery. Lower Goose Island (Wheeler); Tremont (Procter); Norway (S. J. Smith); Bethel (Mus. Comp. Zoöl.); Orono (I. H. Blake); Aroostook No. 1, Ash Point, Old Town (Wing).

46. F. FUSCA var. ALGIDA Wheeler. Kittery Point (R. Thaxter); Robinson Mt. (Procter).

47. F. FUSCA var. GLACIALIS Wheeler. South Harpswell, Casco Bay Region generally (Wheeler); Presque Isle (Wing).

48. F. TRUNCICOLA subsp. OBSCURIVENTRIS Mayr. Doughty's Point on Sebascodegan Island (Wheeler); Mt. Desert (Procter).

49. F. TRUNCICOLA subsp. INTEGRA Nylander. Lower Goose Island, Prince's Point (Wheeler); Salisbury Cove (Johnson); Eden, Corfield, Bar Harbor (Procter); Monmouth (Frost).

50. F. EXSECTOIDES Forel. South Harpswell, Prince's Point (Wheeler); Ogunquit (Pratt); Pittston, Jefferson, Augusta, Vassalboro, China (H. B. Peirson); Old Town (H. B. Peirson, Wing).

Numerous colonies of this species occur near Old Town. All colonies seen by the writer were rather small.

51. F. SANGUINEA subsp. ASERVA Forel. Harpswell Neck, Ash Point, Prince's Point, Lower Goose Island, Sebascodegan Island (Wheeler); Bar Harbor, S. W. Harbor, Green Mt. (Johnson, Procter); Section 26 (Procter); Oakland (D. S. Fink); Enfield (A. W. Berrie); Aroostook No. 1, Ash Point, Old Town, Presque Isle (Wing).

52. F. SANGUINEA subsp. RUBICUNDA Emery. Aroostook No. 1 (Wing).

One populous colony under stone near woods.

53. F. SANGUINEA subsp. SUBINTEGRA Emery. Harpswell Neck, Ash Point, Prince's Point, Lower Goose Island, Sebascodegan Island (Wheeler).

54. F. SANGUINEA subsp. SUBNUDA Emery. South Harpswell (Wheeler).

Aphids of the Genus Kakimia Infesting Ribes (Homoptera[1]).

By G. F. KNOWLTON and M. W. ALLEN.[2]

This report deals with seven species of the aphid genus *Kakimia* H. and F.[3] which attack currants and gooseberries, one species being here described as new. The following key serves to separate available material to species.

Key to Species

A. Cornicles at least 4 times hind tarsi in length.
  B. Sensoria present on antennal IV of alate *muesebecki* n. sp.
  BB. Sensoria absent on antennal IV of alate
    C. Rostral IV + V at least 0.17 mm. long.....*ceri*
    CC. Rostral IV+ V less than 0.17 mm. long, *ribe-utahensis*
AA. Cornicles less than 4 times hind tarsi in length.
  B. Unguis not exceeding 1.25 times antennal III.
    C. Sensoria rarely present on antennal IV of alate *ribifolii*
    CC. Sensoria on antennal IV usually exceeding 2 in number *houghtonensis*
  BB. Unguis usually exceeding 1.25 times antennal III.
    C. Aptera without sensoria on antennals IV and V. *cynosbati*
    CC. Aptera possessing sensoria on antennals IV and V. *thomasi*

KAKIMIA CERI G.-P.

Gillette and Palmer, Ann. Ent. Soc. Amer. 26: 354, 1933.

Collections: Specimens from Colorado, taken on native red currant at Rocky Mountain National Park and Nederland, August 23, 1935 (Knowlton); not yet taken in Utah.

Taxonomy: K. ceri differs from *K. muesebecki* in lacking sensoria on antennal IV of alates. It differs from *K. ribe-utahensis* in lateral hairs of cauda being slender and pointed at tip.

[1] Contribution from the Department of Entomology, Utah Agricultural Experiment Station, Logan.

[2] Research associate professor of entomology and graduate research assistant, respectively.

[3] The writers are indebted to M. A. Palmer, E. O. Essig, C. F. W. Muesebeck, H. B. Mills and L. G. Strom for the loan of berry aphid material.

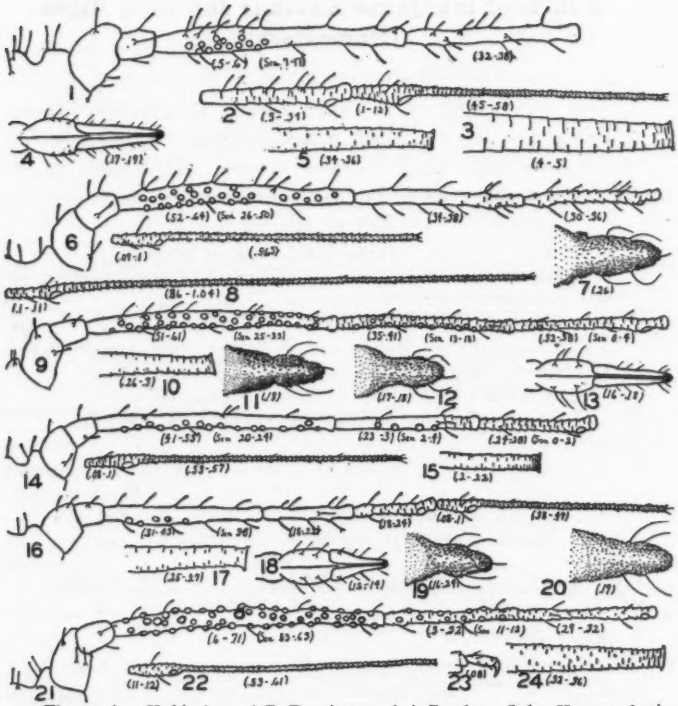

Figure A. *Kakimia ceri* G.-P. Aptera 1-4, 7: alate, 5-6. *K. cynosbati* (Oest.). Alate 8-11, 13. *K. houghtonensis* (Troop). Alate 12, 14-15; aptera 16-19. *K. muesebecki* n. sp. Alate 20-22, 24; aptera 23.

KAKIMIA CYNOSBATI (Oest.)

Oestlund, Geol. and Nat. Hist. Surv. Minn. Bul. 4:81, 1887.

Alate vivipara: Color green; body 1.84 to 1.94 mm. long; antennae 2.45 to 2.66, dusky entire length; hind tibiae 1.64 to 1.76; hind tarsi 0.1; cornicles 0.26 to 0.3, pale; cauda 0.18 mm., pale.

Collections: On wild gooseberry south of Woodruff, Utah, July 5, 1938 (Knowlton); on *Ribes,* Milwaukee, Wisconsin, June 8, 1933 (L. G. Strom); on ornamental gooseberry, Moline, Illinois, May 16, 1931 (Ross-Mohr); and on *Ribes,* Bozeman, Montana, August 30, 1912 (J. R. Parker).

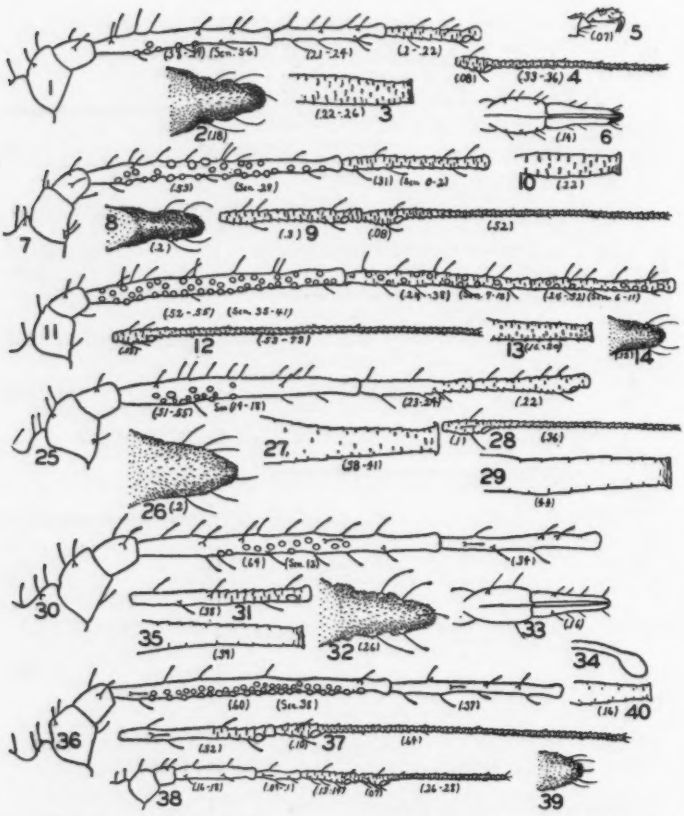

Figure B. *Kakimia ribifolii* (Davidson). Aptera 1-6; alate vivipara 7-10; alate male 11-14. *K. muesebecki* n. sp. Aptera 25-28. *K. ribeutahensis* Knlt. Aptera 29-33, 34 enlarged apex of caudal hair; alate vivipara 35-37; ovipara 38-40.

Taxonomy: *K. cynosbati* differs from *K. thomasi* in having fewer secondary sensoria on antennals III, IV and V of alates and aptera.

KAKIMIA HOUGHTONENSIS (Troop).

Troop, Ent. News 17:59, 1906.

Alate vivipara: Body 1.33 to 1.49 mm. long; antennae, 1.76 to 1.88, dusky; rostral IV + V reaching second coxae; hind

tibiae 1.1 to 1.27, distal end dark; hind tarsi, 0.08 to 0.1; cornicles 0.2 to 0.22, pale; cauda 0.17 to 0.18, pale.

Apterous vivipara. Color yellow; body 1.43 to 176 mm. long; antennae 1.31 to 1.66, pale to slightly dusky; rostral IV + V exceeding second coxae; hind tibia 0.79 to 0.94; hind tarsi 0.08; cornicles 0.25 to 0.27, pale, lightly imbricated.

Apterous ovipara: Body 1.37 mm. long; antennae 0.79 to 0.32, pale; antennal III, 0.16; IV, 0.1; V, 0.1; VI, 0.06 + 0.25; rostral IV + V, 0.1; hind tibiae 0.53; hind tarsi 0.08; cornicles 0.14 to 0.16, pale; cauda, 0.1 to 0.11, pale.

Collections: Aptera extremely abundant on *Ribes grossularia* in Utah at Logan, June 21, 1926 (Knowlton); alates, Dayton, Ohio, May 20, 1925 and males and ovipara, Columbus, Ohio, October 21, 1924 (Knowlton); Milwaukee, Wisconsin, July 2, 1935 (L. G. Strom); Joliet, Montana, July 14, 1915.

Taxonomy: K. houghtonensis differs from *K. ribifolii* in having more sensoria on antennal IV.

Kakimia muesebecki n. sp.[4]

Alate vivipara: Body 1.74 mm. long; antennae 2.05 mm., dusky; antennal III, 0.6 to 0.64 mm. long with 55 to 63 tuberculate sensoria; IV, 0.3 to 0.32 with 11 to 12 sensoria; V, 0.29 to 0.32; VI, 0.11 to 0.12 + 0.53 to 0.61; rostral IV + V, 0.16 to 0.17; hind tibiae 1.37; hind tarsi 0.08; cornicles 0.32 to 0.36, dusky; cauda 0.19, dusky.

Apterous vivipara: Body, 1.84 mm. long; antennae 1.64, pale entire length; antennal III, 0.51 to 0.53 with 14 to 18 sensoria; IV, 0.23 to 0.24; V, 0.22; VI, 0.1 + 0.36; rostral IV + V, 0.17; hind tibiae 1.16; hind tarsi 0.07 to 0.08; cornicles 0.38 to 0.41, pale; cauda, 0.2 mm. long.

Collections: Alate and apterous vivipara collected on *Ribes* at Redwood Canyon, CALIFORNIA, April 12, 1916 (W. M. Davidson).

Taxonomy: This species runs to *K. ceri* G.-P. in Gillette and Palmer's key (Annals Ent. Soc. of Amer. 27:160, 1934) from which it differs in having sensoria on antennal IV of alate vivipara and shorter antennals IV and V. This species was apparently collected from near the type locality of *K. ribifolii* (Dvds.) from which species it differs in the alate form having more sensoria on antennals III and IV, longer cornicles and base of antennal VI.

[4] The writers name this species in honor of C. F. W. Muesebeck of the U. S. Bureau of Entomology and Plant Quarantine. Types are returned to the U. S. National Museum.

KAKIMIA RIBE-UTAHENSIS Knlt.

Knowlton, Ann. Ent. Soc. Amer. 28: 281, 1935.

Alate vivipara: Antennae 2.3 mm. long; rostrum reaching 3rd coxae; hind tibiae 1.47 mm.; cornicles 0.39, slightly dusky; cauda pale.

Apterous vivipara: Body 2.29 mm. long; hind tibiae 1.47; hind tarsi 0.09; cornicles 0.44; cauda 0.26, pale.

Apterous ovipara: Body 1.5 mm. long; antennae 0.9; hind tibiae swollen, 0.53; hind tarsi 0.09; cornicles 0.16 mm., pale; cauda pale.

Taxonomy: Kakimia ribe-utahensis runs to *K. ceri* in Gillette and Palmer's key (Ann. Ent. Soc. Amer. 27:160) from which it differs in having shorter rostral IV + V, more definitely knobbed lateral hairs on cauda, a different seasonal life history, and smaller apterous ovipara.

Collections: Summer vivipara, males and ovipara of *K. ribe-utahensis* were taken at Cedar City, Utah, July 18, 1925, on native black currant (Knowlton).

KAKIMIA RIBIFOLII (Dvds.).

Davidson, Jr. Econ. Ent. 10:294, 1917.

Alate vivipara: Body 1.37 mm. long; antennae 1.98, dusky; cornicles dark, imbrications minutely setulose; cauda dark, 0.2 mm. long.

Apterous vivipara: Body 1.39 to 2.05 mm. long; antennae 1.39 to 1.45, dusky; hind tibiae 0.98 to 1.02; hind tarsi 0.07; rostral IV + V, 0.14 mm.; cornicles and cauda dark.

Alate male: Body 1.55 mm. long; antennae 1.84, dark; antennal III, 0.53 mm. long with 35 sensoria; IV, 0.24 with 7 sensoria; VI. 0.08 + 0.55; cauda 0.1, dark; other characters as in alate vivipara.

Collections: Two slides lent by Professor E. O. Essig were collected on *Ribes* at Berkeley, California, March 18, 1937(W. Sampson); 3 slides from the type locality were secured through C. F. W. Muesebeck from the U. S. National Museum, curling leaves of *Ribes glutinosum* at Redwood Canyon near Walnut Creek, California, May 7, 1914 and March 26, 1915; also a metatype slide, Redwood Canyon May 7, 1914 (W. M. Davidson), was lent by Professor M. A. Palmer.

Taxonomy: K. ribifolii (Dvds.) is close to *K. houghtonensis* (Troop) but differs in having fewer sensoria on antennal IV of alate and shorter unguis in aptera.

KAKIMA THOMASI H.-F.

Hottes and Frison, Ill. Nat. Hist. Surv. Bul. 19: 343, 1931.

Described from specimens collected on *Ribes* at Rock Island, Illinois, July 9, 1929 (Frisom-Hottes).

List of Titles of Publications Referred to by Numbers in Entomological Literature in Entomological News.

1. Transactions of The American Entomological Society. Philadelphia.
2. Entomologische Blätter, red. v. H. Eckstein etc. Berlin.
3. Annales Sci. Naturelles, Zoologie, Paris.
4. Canadian Entomologist. London, Canada.
5. Psyche, A Journal of Entomology. Boston, Mass.
6. Journal of the New York Entomological Society. New York.
7. Annals of the Entomological Society of America. Columbus, Ohio.
8. Entomologists' Monthly Magazine. London.
9. The Entomologist. London.
10. Proceedings of the Ent. Soc. of Washington. Washington, D. C.
11. Deutsche entomologische Zeitschrift. Berlin.
12. Journal of Economic Entomology, Geneva, N. Y.
13. Journal of Entomology and Zoology. Claremont, Cal.
14. Archivos do Instituto Biologico, Sao Paulo.
15. Annales Academia Brasileira de Sciencias. Rio de Janeiro.
17. Entomologische Rundschau. Stuttgart, Germany.
18. Entomologische Zeitschrift. Frankfurt-M.
19. Bulletin of the Brooklyn Entomological Society. Brooklyn, N. Y.
20. Societas entomologica. Stuttgart, Germany.
21. The Entomologists' Record and Journal of Variation. London.
22. Bulletin of Entomological Research. London.
23. Bollettino del Lab. di Zool. gen. e agraria della Portici. Italy.
24. Annales de la société entomologique de France. Paris.
25. Bulletin de la société entomologique de France. Paris.
27. Bolletino della Societa Entomologica Italiana. Genova.
28. Ent. Tidskrift utgifen af Ent. Föreningen i Stockholm. Sweden.
29. Annual Report of the Ent. Society of Ontario. Toronto, Canada.
30. Archivos do Instituto de Biologia Vegetal, R. d. Janeiro.
31. Nature. London.
32. Boletim do Museu Nacional do Rio de Janiero. Brazil.
33. Bull. et Annales de la Société entomologique de Belgique. Bruxelles.
34. Zoologischer Anzeiger, hrsg. v. E. Korschelt. Leipzig.
35. The Annals of Applied Biology. Cambridge, England.
36. Trans. Royal Entomological Society, London. England.
37. Proceedings of the Hawaiian Entomological Society. Honolulu.
38. Bull. of the Southern California Academy of Sciences. Los Angeles.
39. The Florida Entomologist. Gainesville, Fla.
40. American Museum Novitates. New York.
41. Mitteilungen der schweiz. ent. Gesellschaft. Schaffhausen, Switzerland.
42. The Journal of Experimental Zoology. Philadelphia.
43. Ohio Journal of Sciences. Columbus, Ohio.
44. Revista chileña de historia natural. Valparaiso, Chile.
45. Zeitschrift für wissenschaftliche Insektenbiologie. Berlin.
46. Zeitschrift für Morphologie und Ökologie der Tiere. Berlin.
47. Journal of Agricultural Research. Washington, D. C.
49. Entomologische Mitteilungen. Berlin.
50. Proceedings of the U. S. National Museum. Washington, D. C.
51. Notulae entomologicae, ed. Soc. ent. Helsingfors. Helsingfors, Finland.
52. Archiv für Naturgeschichte. hrsg. v. E. Strand. Berlin.
53. Quarterly Journal of Microscopical Science. London.
54. Annales de Parasitologie Humaine et Compareé. Paris.
55. Pan-Pacific Entomologist. San Francisco, Cal.

56. "Konowia". Zeit. für systematische Insektenkunde. Wien, Austria.
57. La Feuille des Naturalistes. Paris.
58. Entomologische Berichten. Nederlandsche ent. Ver. Amsterdam.
59. Encyclopédie entomologique, ed. P. Lechevalier. Paris.
60. Stettiner entomologische Zeitung. Stettin, Germany.
61. Proceedings of the California Academy of Sciences. San Francisco.
62. Bulletin of the American Museum of Natural History. New York.
63. Deutsche entomologische Zeitschrift "Iris". Dresden.
64. Zeitschrift des österr. entomologen-Vereines. Wien.
65. Zeitschrift für angewandte Entomologie, hrsg. K. Escherich. Berlin.
66. Report of the Proceedings of the Entomological Meeting. Pusa, India.
67. University of California Publications, Entomology. Berkeley, Cal.
68. Science. New York.
69. Physis. Revista Soc. Argentina Cien. Nat. Buenos Aires.
70. Entomologica Americana, Brooklyn Entomological Society. Brooklyn.
71. Novitates Zoologicae. Tring, England.
72. Revue russe d'Entomologie, Leningrad, USSR.
73. Mem. Instituto Butantan. Sao Paulo, Brazil.
74. Sbornik entomolog. národniho musea v Praze. Prague, Czechoslovakia.
75. Annals and Magazine of Natural History. London.
77. Comptes rendus heb. des séances et mémo. de la soc. de biologie. Paris.
78. Bulletin Biologique de la France et de la Belgique. Paris.
79. Koleopterologische Rundschau. Wien.
80. Lepidopterologische Rundschau, hrsg. Adolf Hoffmann. Wien.
82. Bulletin, Division of the Natural History Survey. Urbana, Illinois.
83. Arkiv för zoologie, K. Svenska Vetenskapsakademien i. Stockholm.
84. Ecology. Brooklyn.
85. Genetics. Princeton, New Jersey.
87. Archiv für Entwicklungs mechanik der Organ., hrsg. v. Roux. Leipzig.
88. Die Naturwissenschaften, hrsg. A. Berliner. Berlin.
89. Zoologische Jahrbücher, hrsg. v. Spengel. Jena, Germany.
90. The American Naturalist. Garrison-on-Hudson, New York.
91. Journal of the Washington Academy of Sciences. Washington, D. C.
92. Biological Bulletin. Wood's Hole, Massachusetts.
93. Proceedings of the Zoological Society of London. England.
94. Zeitschrift für wissenschaftliche Zoologie. Leipzig.
95. Proceedings of the Biological Soc. of Washington, Washington, D. C.
97. Biologisches Zentralblatt. Leipzig.
98. Le Naturaliste Canadien. Cap Rouge, Chicoutimi, Quebec.
99. Mélanges exotico-entomologiques, Par Maurice Pic. Moulins, France.
100. Bulletin Intern., Acad. Polonaise Sci. et Lett. Cracovie.
101. Tijdschrift voor entomologie. Nederland. Ent. Ver., Amsterdam.
102. Entomologiske Meddelelser, Entomologisk Forening, Copenhagen.
103. Journal of the Kansas Entomological Society, Lawrence, Kansas
104. Revista de la Sociedad entomologica Argentina, Buenos Aires.
105. Revista Entomologia, Sao Paulo, Brazil.
106. Anales Sociedad Cientifica Argentina, Buenos Aires.
107. Proc., Royal Entomological Society, London.
108. Revista, Col. Nac. Vicente Rocafuerte, Guayaquil.
109. Arbeiten uber morpholog. und taxonom. ent. aus Berlin-Dahlem.
110. Arbeiten ueber physiolog. u. angewandte ent. aus Berlin-Dahlem.
111. Memorias do Instituto Oswaldo Cruz. Rio de Janeiro.
112. Anales del Instituto de Biologia Mexico.
113. Entomologische Beihefte aus Berlin Dahlem.
114. Occasional Papers of the Museum of Zoology, University of Michigan.
115. Memorias de la Soc. Cubana de Hist. Nat. Havana, Cuba.
116. Parasitology. Ed. Keilin and Hindle. London.

Current Entomological Literature

COMPILED BY V. S. L. PATE, L. S. MACKEY and E. G. FISHER.

Under the above head it is intended to note papers received at the Academy of Natural Sciences of Philadelphia pertaining to the Entomology of the Americas (North and South), including Arachnida and Myriopoda. Articles irrelevant to American entomology will not be noted; but contributions to anatomy, physiology and embryology of insects, however, whether relating to American or exotic species will be recorded.

This list gives references of the current or preceding year unless otherwise noted. All continued papers, with few exceptions, are recorded only at their first installment.

For records of Economic Literature, see the Experiment Station Record, Office of Experiment Stations, Washington. Also Review of Applied Entomology, Series A, London. For records of papers on Medical Entomology, see Review of Applied Entomology, Series B.

Note. References to papers containing new forms or names not so stated in titles are followed by (*); if containing keys are followed by (k); papers pertaining exclusively to neotropical species, and not so indicated in the title, have the symbol (S) at the end of the title of the paper.

The figures within brackets [ ] refer to the journal in which the paper appeared, as numbered in the list of Periodicals and Serials published in our January and June issues. This list may be secured from the publisher of **Entomological News** for 10c. The number of, or annual volume, and in some cases the part, heft, &c., the latter within ( )follows; then the pagination follows the colon :

Papers published in the Entomological News are not listed.

GENERAL.—Abrams, L.—Entomological collections. [14th Ann. Rep. Nat. Hist. Mus. Stanford Univ.] 1937-38: 3-4. **Bartlett, K. A.**—A search in the Guianas and Trinidad for predatory beetles of the bamboo scales. [Jour. Agric. Univ. P. R.] 22: 493-495. **Beaulne, J. I.**—Liste des parasites et predateurs recoltes au Laboratoire d'Entomologie a Quebec. [98] 66: 95-96. **Bovien, P.**—Some types of association between Nematodes and Insects. [Vidensk. Medd. fra Dansk naturh. Foren.] 101: 1-114, ill. **Brues, C. T.**—The mimetic resemblance of flies of the genus Systropus to wasps. [5] 46: 20-22. **C. H. D. C.**—A new "Nomenclator Zoologicus." [Can. Field-Nat.] 53: 62. **Davis, J. J.**—The necessity of a changing world. [12] 32: 1-10. **Goidanich, A.**—Il deperimento primaverile del Sorgo zuccherino in Piemonte nei suoi rapporti congli insetti e in particolare con gli Afidi. [Boll. Inst. Ent. Bologna] 10: 281-315, ill. **Henze, Dr.**—Köninginnen in einem Hornissenschwarm. [Kosmos] 36: 116-117, ill. **Holloway, J. K.**—An agar preparation for feeding adult parasite insects. [12] 32: 154. **Johnson & Mellanby.**—Bedbugs and cockroaches. [107] A, 14:50. **Jones, M. P.**—4-H Club Insect Manual. [U. S. D. A.] Misc. Publ. 318: 63 pp., ill. **Liu, Gaines.**—Some extracts from the history of entomology in China. [5] 46: 23-28. **Parks et al.**—Agencies utilized in disseminating information on insect control. [12] 32: 11-21. **Philip, C. B.**—Ticks as vectors of animal diseases. [4] 71: 55-65.

Poulton, E.—Wings of butterflies, day and night-flying moths and other insects collected by the late F. W. Urich in the haunts of a Trinidad bat, Micronycterus megalotis. [107] A, 14: 38-40. "Survival value of Acridian protective coloration." [107] A, 14: 31-32. **Rawson, D. S.**—A biological survey of Okanagan Lake, British Columbia. Bottom Fauna. [Fish. Res. Bd. Canada] Bull. 56: 17-18. **Schmidt, W. J.**—Arthropoden in Polarisationsoptischer nachweis des chitins. [Zeit. wiss. Mikroskopie] 56: 40-44. **Taylor, T. H. C.**—The usefulness of entomological collections in agricultural institutions. [E. African Agric. Jour.] 4: 356-360. **Teale, E. W.**—Grassroots Jungles; a book of insects. Dodd Mead & Co., N. Y., 231 pp., ill. **Thomas, C. A.**—The animals associated with edible fungi. [6] 47: 11-37. **Townsend, C. H. T.**—Speed of Cephenemyia. [6] 47: 43-46.

ANATOMY, PHYSIOLOGY, ETC.—Argo, V. N.—The effect of temperature upon the oxygen requirements of certain adult insects and insect eggs. [7] 32: 147-163. **Asana, J. J.**—A chromosomal survey of some Indian insects. I. Morphology of the chromosomes in eight species of the Locustidae. [Jour. Fac. Sci. Hokkaido Imp. Univ.] 6: 211-234, ill. **Becker, W. B.**—Larval development of the native elm bark beetle, Hylurgopinus rufipes in Massachusetts. [12] 32: 112-121. **Bernard, F.**—Recherches sur la morphogénèse des yeux composés d'Arthropodes. Développement. Croissance, Réduction. [Suppl. Bull. Biol. France et Beligique] 23: 162 pp., ill. **Bess, H. A.**—Investigations on the resistance of mealybugs (Homoptera) to parasitization by internal Hymenopterous parasites, with special reference to phagocytosis. [7] 32: 189-226, ill. **Braun, W.**—Contributions to the study of development of the wing-pattern in Lepidoptera. [Biol. Bull.] 76: 226-240, ill. **Buscalioni & Grandi.**—See under Hymenoptera. **Chadwick, L. E.**—A simple stroboscopic method for the study of insect flight. [5] 46: 1-8. **Chiu, Shin Foon & McCay.** Nutritional studies on the confused flour beetle (Tribolium confusum) and the bean weevil (Acanthoscelides obtectus). [7] 32: 164-170. **Clausen, C. P.**—The effect of host size upon the sex ratio of Hymenopterous parasites and its relation to methods of rearing and colonization. [6] 47: 1-9. **DeBach & McOmie.**—New diseases of termites caused by bacteria. [7] 32: 137-146. **Dethier, V. G.**—Further notes on cannabilism among larvae. [5] 46: 29-35. **Drilhon & Busnel.**—Sur la présence et la teneur flavine des tubes de Malpighi

des insectes. [Comp. Rend Sea. L'Acad Sci., Paris] 208: 839-841. **Evans, A. C.**—The utilization of food by the larvae of the Buff-tip, Phalera bucephala (Lep.) [107] A, 14: 25-30. **Flanders, S. B.**—Environmental control of sex in Hymenopterous insects. [7] 32: 11-26, ill. **Forbes, W. T. M.**—The muscles of the Lepidopterous male genitalia. [7] 32: 1-10, ill. **Gunderson & Strand.**—Toxicity of Hydrogen cyanide, chlorpicrin and ethylene oxide to eggs, nymphs and adults of the bedbug. [12] 32: 106-110, ill. **Hilton, W. A.**—Nervous system and sense organs. LXXVII: Odonata. [13] 31: 9-16, ill. **Hodson, A. C.**—Biological notes on the egg parasites of Malacosoma disstria. [7] 32: 131-136. **Imms, A. D.**—On the antennal musculature in insects and other arthropods. [Quart. Jour. Micro. Sci., London] 81: 273-320, ill. **Khouvine & Gregoire.**—Repartition du phosphore dans les larves, les pupes et les imagos de Calliphora erythrocephala. [Comptes Rendus Sea. Soc. Biol. Paris] 130: 1050-1051. **Lecamp, M.**—Sur la régénération des pièces buccales chez les Phasmes. [Comptes Rendus Hebdom Sea. Acad. Sci. Paris] 208: 1052-1054. **Lindsey, A. W.**—Variations of insect genitalia. [7] 32: 173-176, ill. **List, G. M.**—The effect of temperature upon egg deposition, egg hatch and nymphal development of Paratrioza cockerelli (Homopt.: Psyllid.) [12] 32: 30-36. **Maki, T.**—Studies on the thoracic musculature of insects. [Mem. Fac. Sci. Agric. Taihoku Imp. Univ.] 24: 343 pp., ill. **McNay, C. G.**—Studies on repellents for biting flies. [4] 71: 38-44. **Pradhan, S.**—Neuro-muscular study of the mouth-parts of Coccinella septempunctata, with a comparison of the mouth-parts in carnivorous and herbivorous coccinellids. [Rec. of the Indian Mus.] 40: 341-358, ill. **Rawat, B. L.**—On the habits, metamorphosis and reproductive organs of Naucoris cimicoides (Hemipt.). [36] 88: 119-138, ill. **Roeder, K. D.**—The action of certain drugs on the insect central nervous system. [Biol. Bull. 76: 183-189. **Skufyin, K.**—Changes in the wing veins of Drosophila melanogaster due to developmental depression. [Nauch. Raboty Molodyk Uchenyk Trudy] 1938: 227-236, ill. (Russian with English summary). **Walton & Fenton.**—Notes on Empusa grylli in Oklahoma. [12] 32: 155-156. **Wieting & Hoskins.**—The olfactory responses of flies in a new type of insect olfactometer. II.—Responses of the housefly to ammonia, carbon dioxide and ethyl alcohol. [12] 32: 24-29, ill. **Woodruff, L. C.**—An analysis of insect growth curves.

[6] 47: 47-55, ill. **Yeager, J. F.**—Apparent nuclear-cytoplasmic transfer in some insect blood cells. [7] 32: 49-57, ill. Significance of the presystolic notch in the mechanocardiogram of Periplaneta americana. [7] 32: 44-48, ill.

ARACHNIDA AND MYRIOPODA.—Brues, C. T.—Additional records of Onychophora from the island of Haiti. [5] 46: 36-37, ill. **Lowrie, D. C.** —Geolycosa, The Wolf of the Dunes. [The Chicago Nat.] 2: 1-8, ill. **Michelbacher, A. E.**—Seasonal variation in the distribution of two species of Symphyla found in California. [12] 32: 53-57, ill. **Moreno, A.**—Contribucion al estudio de los escorpionidos Cubanos. Superfam. Buthoidea. [Mem. Soc. Cubana Hist. Nat.] 13: 63-75, ill. (k*).

THE SMALLER ORDERS OF INSECTS.—Arle, R.—Collemboles nouveaux de Rio de Janeiro. [Ann. Acad. Brasileira Sci.] 11: 25-32, ill. (*). **Bailey, S. F.**—The six-spotted thrips, Scolothrips sexmaculatus.][12] 32: 43-46, ill. **Blanton, F. S.**—Notes on some thrips collected in the vicinity of Babylon, Long Island, N. Y. [6] 47: 83-94. **Coleman, C.**—Preliminary report on the Poduridae of southern California. [13] 31: 3. **Cory, E. N.**—The termite, an object lesson. [4] 71: 36-38. **Crawford, J. C.**—Thysanoptera from northern New Jersey, with descriptions of n. spp. [6] 47: 69-81. **Henriksen, K. L.**—Siphonaptera. [Zool. Iceland] 3:7. **Kennedy, C. H.**—Protallagma runtuni n. sp. of dragonfly from Ecuador with notes on the genus. (Odonata: Coenagriidae). [7] 32: 177-187, ill. Archaepodagrion bicorne, a very primitive dragonfly from eastern Ecuador (Odonata: Megapodagrioninae). [7] 32: 32-43, ill. **McDunnough, J.**—New British Columbian Ephemeroptera. [4] 71: 49-54, ill. **Milne, M. J.**—Immature North American Trichoptera. [5] 46: 9-19, (k). **Ross, H. H.**—N. spp, of Trichoptera from the Appalachian region. [10] 41: 65-72, ill. **Thompson, G. B.**—Mallophaga. [Res. Voyage de la Belgica en 1897-99] 1938: 6 pp., ill. (s). **Wolcott, G. N.**—Comejen y Polilla. [Est. Exp. Agric. Univ. Puerto Rico] Bol. 48: 26 pp., ill.

ORTHOPTERA.—Eichler, W.—Lebensraum und Lebensgeschichte der Dahlemer Palmenhausheuschrecke Phlugiola dahlemica (Tettigoniid.). [11] 1938: 497-570, ill. **Gunther, K.**—Neue und wenig bekannte Phasmoiden aus dem Indian Museum, Calcutta. [Rec. of the Indian Mus.] 40: 123-141, ill. (s*). **LeFeuvre, W. P.**—A Phasmid with

spermatophore. [107] A, 14:24. **Miller, N. C. E.**—Oviposition by Heteropteryx dilatatus (Phasm.). [107] A, 14:48. **Poulton, E.**—See under General. **Tillyard, R. J.**—Kansas Permian insects. Part 21. The cockroaches, or order Blattaria. [Amer. Jour. Sci.] 34: 249-276, ill. (k). **Uvarov, B. P.**—Notes on a desert grasshopper with digging habits, Eremogryllus hammadae (Acrid.). [107] A, 14: 19-23, ill. **Walton & Fenton.**—See under Anatomy.

HEMIPTERA.—Allen & Knowlton.—Aphis species infesting Ribes. [7] 32: 125-130, ill. (k*). **Anon.**—Osservazioni Tassonomiche, corologiche ed ecologiche sugli Afidi. [Boll. Inst. Ent. Bologna] 10: 316-346, ill. **Balduf, W. V.**—Food habits of Phymata pennsylvanica americana. [4] 71: 66-74. **Cassidy & Barber.**—Hemipterous insects of cotton in Arizona: their economic importance and control. [12] 32: 99-104, ill. **Davidson & DeLong.**—Studies of the gen. Empoasca (Cicadell.), Pt. 6.—Twenty-two n. spp. of Empoasca from North America. [43] 39: 110-118. **Drake & Harris.**—Veliidae y Gerridae Sudamericans. [Notas del Museo, Buenos Aires] 3: 199-204, ill. (s*). **Palmer, M. A.**—Observations on vagabond gall aphids in cottonwood. [Jour. Colo.—Wyom. Acad. Sci.] 2:37. **Plank, H. K.**—Oeregrinator biannulipes [Reduviidae] a predator of the Bamboo Powder-Post Beetle in Porto Rico [Bostrychidae] [12] 32: 151. **Rawat, B. L.**—See under Anatomy. **Romney, V. E.**—Breeding areas of the tomato psyllid, Paratrioza cockerelli. [12] 32:150. **Uvarov, B. P.**—An American Membracid in Jugoslavia. [107] A, 14:48.

LEPIDOPTERA.—Bird, H.—A Papaipema from Arizona. [4] 71: 74-76, ill. (*). **Braun, W.**—See under Anatomy. **Clarke, J. F. G.**—A new Geometrid genus from North America, with a discussion of its type. [10] 41: 73-75, ill. **Comstock & Dammers.**—Studies in the metamorphoses of six California moths. [Bull. So. Calif. Acad. Sci.] 37: 105-128, ill. **Corfe, C. E.**—Celerio lineata in Ontario. [Can. Field Nat.] 53:58. **Freeman, T. N.**—Notes on Sympistis kolthoffi and S. zetterstedti laboradoris from Churchill, Manitoba. [4] 71: 77-78. **Gerasimov, A. M.**—Die Chaetotaxie des analsegments der Raupen. [64] 24: 36-39, ill., cont. **Heinrich, C.**—The cactus-feeding Phycitinae; a contribution toward a revision of the American Pyralidoid moths of the family Phycitidae. [50] 86: 331-413, ill., (k*). **Hemming, F.**—On five genera in the Lepidoptera Rhopalo-

cera at present without valid names. [107] B, 8:39, (*). **Klima, A.**—Lepidopterorum Catalogus. Pars. 89. Pyralididae: Subfam. Pyraustinae I. 224 pp. **Lindsey, A. W.**—A n. spp. of Hesperia. [7] 32: 171-172. **Meiners, E. P.**—The life history of Euchloe olympia, with some notes on its habits. [Proc. Missouri Acad. Sci.] 4: 154-156. **Naumann, F.**—Tabellarisches Verzeichnis der europaischen Lepidopteren mit reduziertem oder schwach ausgebildtem Russel und deren Flugzeit. [63] 1938: 112-121. **Schaus, W.**—New neotropical lepidoptera of the family Notodontidae [Ann. Carnegie Mus.] 27: 321-348, ill. (*). **Shepard, H. H.**—Lepidopterorum Catalogus. Pars 90. Hesperiidae: Subfam. Hesperiinae II. 127-206. **Stichel, H.**—Lepidopterorum Catalogus. Pars 91. Nymphalidae II. Subfam. Charaxidinae I. 375-542. **Swain, R. B.**—Notes on the biology of the Great Basin Tent Caterpillar, Malacosoma fragilis, (Lasiocamp.). [4] 71: 76-77. **Wheeler, L. R.**—Deaths among butterflies. [Pro. Linn. Soc. London] 1938-9: 79-88.

DIPTERA.—Adams, C. F.—A preliminary list of flowerflies (Syrphid.) from Missouri. [Proc. Missouri Acad. Sci.] 4: 153-154. **Alexander, C. P.**—Studies on the craneflies of Mexico, Pt. VI. [7] 32: 70-90, (*). **Bartlett, K. A.**—See under Coleoptera. **Felt, E. P.**—A new gall midge on Rhododendron. [6] 47: 41-42. **Hardy & Knowlton.**—New and little known western Pipunculidae. [7] 32: 113-124, ill. **Harmston & Knowlton.**—A new Dolichopus from Iowa. [10] 41: 87-88, ill. **James, M. T.**—The robber flies of Colorado. [Jour. Colo.—Wyom. Acad. Sci.] 2:39. **Pinto, C.**—O Phlebotomus fischeri, 1926 nao e absolutamente sinonimo do Phlebotomus longipalpis e neiva, 1912. [Ann. Acad. Brasileira Sci. 11: 59-66. (*). **Priddy, R. B.**—Preliminary report on the Bombyliidae of southern California. [13] 31: 1-2. **Reinhard, H. J.**—A review of the Muscoid gen. Eumacronychia with key and descriptions of n. ssp. [6] 47: 57-68. **Rozeboom, L. E.**—The larva of Psorophora (Janthinosoma) horrida (Culicidae). [Jour. Parasit.] 25: 145-147, ill. **Scott, H.**—A new species of Nycteribiidae from islands in the Gulf of California. [Allan Hancock Pacific Exped.] 2: 167-170, ill. (*). **Skufyin, K.**—See under Anatomy. **.Stalker & Spencer.**—Four n. spp. of Drosophila with notes on the Funebris Group. [7] 32: 105-112, ill. **Steyskal, G.**—A n. sp. of Dictya (Sciomyz.). [4] 71: 78, ill. **Townsend, C. H. T.**—Note on Paratheresia introduction in Louisiana. [6] 47:38. See under General. **Tulloch, G. S.**—Ecological

notes on mosquitoes associated with Bromeliads. [Jour. Agric. Univ. P. R.] 22: 499-501. **Tuomikoski, R.**—See under Special.

COLEOPTERA.—Balfour-Browne, J.—On Copelatus and Leiopterus (Dytisc.) with descriptions of n. spp. [36] 88: 57-88, ill. **Bartlett, K. A.**—The dung rolling beetle [Canthon pilularius] as a host of a Sarcophid parasite [Carcophaga alcedo]. [12] 32:150. **Benick, L.**—Die Steninen Mittelamerikas (Staph.) [Mitt. Munchner Ent. Gesell.] 29: 12-42, ill. (*). **Blaisdell, F. E.**—Studies in the relationships of the subfamilies and tribes of the Tenebrionidae based on the primary genital characters also descriptions of new species. [1] 65: 43-60, ill. **Brown, W. J.**—Some American spp. of Ludius (Elateridae). [4] 71: 44-49, ill., (*). **Bruch, C.**—Miscelaneas Entomologicas. [Notas del Museo de La Plata] 3: 155-173, ill. (s*). **Buchanan, L. L.**—Changes of names in Carabidae and Rhynchopophora. [10] 41: 79-82. **Cazier, M. A.**—Two new California Acmaeodera. (Buprestid.). [Bull. So. Calif. Acad. Sci.] 37: 137-140. (*), **Darlington, P. J.**—West Indian Carabidae. New forms from the Dominican Republic and Puerto Rico. [Mem. Soc. Cubana Hist. Nat.] 13: 79-101. **Dodge, H. R.**—The bark beetles of Minnesota (Scolytid.). [Univ. Minn. Agric. Exp. Sta.] Tech. Bull. 132: 60 pp. (k) **Knull, J. N.**—Four new Arizona Coleoptera (Cleridae, Corynetidae & Buprestidae). [7] 32: 27-31, ill. **Plank, H. K.**—See under Hemiptera. **Roberts, A. W. R.**—On the taxonomy of Erotylidae with special reference to the morphological characters of the larvae. [36] 88: 89-118, ill., (k). **Ruffo, S.**—Studi sui Crisomelidi. [Boll. Ist. Ent. Bologna] 10: 178-222, ill. **Saylor, L. W.**—Two new California Phyllophaga (Scarab.) [10] 41: 88-91, ill. (k). **Schedl, K. E.**—Some new neotropical spp. of Scolytidae in the collection of the British Museum. [107] B, 8: 12-16, ill. **Smith, F. K.**—Amphizoidae and Haliplidae of Colorado. [Jour. Colo.—Wyom. Acad. Sci.] 2: 37-38. **Straneo, S. L.**—On the genus Abaris (Carab.). [5] 46: 38-41, ill., (Sk*).

HYMENOPTERA.—Bartlett, K. A.—A Dryinid parasite attacking Baldulus maidis in Puerto Rico. [Jour. Agric. Univ. P. R.] 22: 497-498. **Bequaert, J.**—Odynerus annectens and related spp. with additional notes on Odynerus hildago. [7] 32: 58-69, ill. (k*). **Buscalioni & Grandi.**—Il Ficus carcia la sua biologia, la sua coltivazione e i suoi

rapporti con l'insetto pronubo (Blastophaga psenes). [Boll. Ist. Ent. Bologna] 10: 223-279, ill. **Grandi, G.**—Nuovi Agaonidi (Chalcid.) raccolti nel Brasile dal Prof. F. Silvestri. [Bull. Ist. Ent. Bologna] 10: 44-69, ill. (s). **Kinsey, A. C.**—The origin of higher categories in Cynips. [Indiana Univ. Publ.] Sci. Series No. 4 (1936) 334 pp., ill. (k*). **Knowlton & Harmston.**—Utah Hymenoptera. [Utah Agric. Exp. Sta.] Mimeog. Ser. 200: 8 pp. **Muesebeck, C. F. W.**—Five n. spp. of Meteorus (Bracon.). [10] 41: 83-87. **Pierce, W. D.**—The black widow spider and its parasites. [Bull. So. Calif. Acad. Sci.] 37: 101-104, ill. (*). **Smith, M. R.**—A n. sp. of North American Ponera, with an ergatandrous form (Formicid.). [10] 41: 76-78, ill. **Weber, N. A.**—Ants of rare genera and a n. gen. of Ponerine ants. [7] 32: 91-104, ill. (s*).

SPECIAL NOTICES. — Beobachtungen uber das schwarmen und die kopulation einiger Empididen. By R. Tuomikoski. [Ann. Ent. Fennici] 5: 1-30, ill.

SPECIAL NOTICES.—The British Mosquitoes.—By J. F. Marshall. London. 1938. 341 pp., ill. **Entomologische Mededeelingen** van Nederlandsch-Indie. A comparatively recent new journal published by the Entomological Society of the Netherland Indies, Buitenzorg, Java, under editorship of Dr. J. van der Vecht. Published to date: Deel I, 1935: deel 4, no. 4 Dec. 1938. **Zur Kenntnis der** Dryinidae (Sphecoid.) Haupt, H. [Zeit. Naturwissensch.] 92: 13-35, ill. **Die Legewerkzeuge der** Blattwespen (Tenthredinoidea). Zirngiebl, L. [Beit. Naturk. Forsch. Sudwestdeutschland] 3: 39-65, ill. **Pieris bryoniae O.**—und Pieris napi L. By Muller & Kautz. 191 pp., ill. Wien 1938.

A CONTRIBUTION TO THE BIOLOGY OF NORTH AMERICAN VESPINE WASPS. By CARL D. DUNCAN. Stanford University Publications, Biological Sciences, vol. VIII, No. 1, 1939. 272 pp., 54 plates. This elaborate and valuable monograph of the western yellow jacket, *Vespula pensylvanica,* with occasional references to other species, covers three main topics. Two of these are studied in the first section (pp. 13-84), which is a detailed and profusely illustrated account of external morphology, combined with a description of the musculature and its

mechanism. The homologies appear to have been worked out with the utmost care. This section should provide the taxonomist with the correct terminology of sclerites, sutures and areas, not only for the Vespidae but also for most other Aculeata. A brief chapter (pp. 85-97) is devoted to subfamily and generic characters. The bulk of the book (pp. 98-176) is a fascinating account of the biology of *V. pensylvanica,* with frequent glimpses of other species. Among other topics, it discusses hibernation, food and feeding behavior, building activities, life-history and metamorphosis. There is a good description of larva and pupa (pp. 162-166). Instincts and other psychological aspects of wasp behavior are not touched upon. As shown by the "Literature Cited" (pp. 177-184), American writings have been fully considered, European publications (particularly of recent years) very little. As a comprehensive account of one species of social wasp, the book ranks quite high and, it is hoped, will set a standard for other students. Two observations seem to record novel features, at any rate to the reviewer. On two occasions colonies were observed which survived the mild winter of California, being active for part of a second season. One of these was of *V. vulgaris,* the other of *V. pensylvanica.* (pp. 140-141 and 159). Some evidence is also given (p. 170) that *V. maculifrons* might occasionally overwinter as a colony in Florida. The author observed rather frequently that the face of older, unused combs of the nest may be papered over (p. 149). The biological differences pointed out between *Dolichovespula* and *Vespula* (pp. 94 and 96) are essentially the same as those found in Europe by Weyrauch, although both observers reached their conclusions quite independently.—J. BEQUAERT.

Doings of Societies

THE PUGET SOUND ENTOMOLOGICAL SOCIETY.

Entomological workers in western Washington gathered at the University of Washington, Seattle, on Friday, March 10, 1939, and organized The Puget Sound Entomological Society. The objectives of the society are to promote the study of insects, arachnids, and terrestrial arthropods in western Washington, and to promote the mutual welfare of the members through the exchange of ideas at meetings and field trips. Membership is open to persons of good character who are

engaged in entomological activities. The society will hold two regular meetings annually, in February and October, the precise time and place to be determined by the Executive Committee which is composed of three elective officers. The present officers are: Professor Trevor Kincaid, University of Washington, president; Mr. S. E. Crumb, Entomologist, Bureau of Entomology and Plant Quarantine, vice-president, and Dr. E. P. Breakey, Entomologist, Western Washington Experiment Station, secretary-treasurer. Special meetings may be called by the Executive Committee at such time and place as it may determine.

The organization of the Puget Sound Entomological Society was the result of a movement initiated in the fall of 1938 by Dr. Breakey. Thirty-two persons with entomological interests, both professional and hobby, gathered in Puyallup on November 18, 1938. Many spent the afternoon visiting the Western Washington Experiment Station, and the U. S. Bureau of Entomology and Plant Quarantine Field Stations in Puyallup and Sumner. In the evening the group gathered for dinner, after which a discussion was held on the desirability of forming a permanent organization. Dr. Breakey was elected provisional chairman and Mr. Charles F. Doucette, Bureau of Entomology and Plant Quarantine, Sumner, provisional secretary. The chairman appointed a committee on organization: Prof. Melville H. Hatch, University of Washington, chairman, to present a constitution and by-laws for discussion and approval at the next meeting. A nominating committee, Mr. W. W. Baker, Bureau of Entomology and Plant Quarantine, chairman, was also appointed.

The October meeting is to be held in Puyallup.

E. P. BREAKEY, Secretary-Treasurer.

Leptothorax manni Wesson synonymous with L. pergandei Emery (Hymenoptera: Formicidae).

In 1935 (Ent. News vol. 46 pp. 208-210) I described *Leptothorax (Dichothorax) manni* (name preoccupied by *L. manni* Wheeler) from Tennessee and distinguished it from *L. (D) pergandei* Emery to which it was closely allied. Since publication, I have had opportunity to examine much more material in this group, and conclude therefrom that *L. manni* Wesson is synonymous with *L. pergandei* Emery.

L. G. WESSON, Jr.

EXCHANGES

This column is intended only for wants and exchanges, not for advertisements of goods for sale or services rendered. Notices not exceeding three lines free to subscribers.

These notices are continued as long as our limited space will allow; the new ones are added at the end of the column, and, only when necessary those at the top (being longest in) are discontinued.

Geometers Wanted from all parts of United States and Canada, for cash or in exchange for butterflies. Noctuids or other Geometers. Edwin I. Guedet, P. O. Box 305, Napa, California.

Mr. Robert "Colegio de la Salle, Vedado, Habana, Cuba," offers Coleoptera, Lepidoptera, Land and Sea Shells, Bird Skins, Botanical Specimens, Cuban Cactus and cleaned "Diatom" Material.

Wanted for cash or exchange any pamphlets dealing with the American Hesperiidae. K. J. Hayward, Entomologist, Concordia Experiment Station, E. R. Argentine.

Wanted—*Megathymus streckeri* from S. W. Colo. or New Mex. Also from Texas. Also *M. yuccae* from Colo. Offer in exch. *Meg. leussleri* Holl. (Nebr. race *streckeri*). R. A. Leussler, 115 S. 52nd St., Omaha, Nebr.

Wanted—Cantharidae of the United States, esp. those of the genus Cantharis. Will exchange named beetles of Oregon. K. M. Fender, 930 S. Davis St., McMinnville, Oregon.

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